

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2005/002578

A. CLASSIFICATION OF SUBJECT MATTER

Int.C1⁷ F04B49/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.C1⁷ F04B49/06Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2005
Kokai Jitsuyo Shinan Koho 1971-2005 Toroku Jitsuyo Shinan Koho 1994-2005

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 8-302755 A (Hitachi Construction Machinery Co., Ltd.), 19 November, 1996 (19.11.96), Full text; Figs. 1 to 34 & US 6101456 A	2 1, 3-14
Y	JP 11-311203 A (Yutani Heavy Industries, Ltd.), 09 October, 1999 (09.11.99), Full text; Figs. 1 to 5 (Family: none)	1, 3-14
Y	JP 6-307409 A (Amada Co., Ltd.), 01 November, 1994 (01.11.94), Full text; Figs. 1 to 6 (Family: none)	1, 3-14

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search
08 March, 2005 (08.03.05)Date of mailing of the international search report
22 March, 2005 (22.03.05)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 4-220701 A (Tokimec Inc.), 11 August, 1992 (11.08.92), Full text; Figs. 1 to 12 (Family: none)	1, 3-14
Y	JP 11-303760 A (Yuken Kogyo Kabushiki Kaisha), 02 November, 1999 (02.11.99), Par. No. [0014]; Fig. 1 (Family: none)	10-11
A	JP 3-149602 A (Mannesmann Rexroth GmbH), 26 June, 1991 (26.06.91), Full text; Figs. 1 to 15 & US 5179330 A & DE 3931962 A1	1, 3-14